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APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
09/762,410 ✓	05/17/2001 ✓	3627	990 ✓	MRKS/0027 ✓	1 ✓	17 ✓	3 ✓

CONFIRMATION NO. 3881

FILING RECEIPT



OC000000006165619

 William B Patterson
 Thomason Moser & Patterson
 3040 Post Oak Boulevard Suite 1500
 Houston, TX 77056

Date Mailed: 06/08/2001

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Customer Service Center. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

Applicant(s)

Paul David Metcalfe, Scotland, GBN; ✓

Domestic Priority data as claimed by applicant

THIS APPLICATION IS A 371 OF PCT/GB99/02605 08/09/1999 ✓ ✓

Foreign Applications ✓ ✓

UNITED KINGDOM 9817246.3 08/08/1998

Projected Publication Date: N/A

Non-Publication Request: No

Early Publication Request: No

Title

Connector for expandable well screen ✓

Preliminary Class

285

Data entry by : NGUYEN, SON

Team : OIPE

Date: 06/08/2001

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

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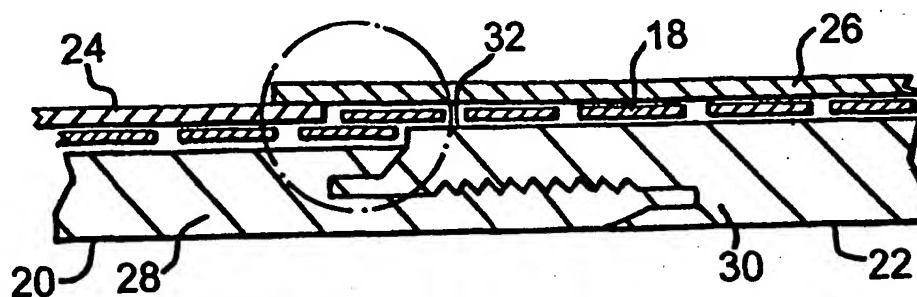
WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : E21B 43/08, 43/10	A2	(11) International Publication Number: WO 00/08301 (43) International Publication Date: 17 February 2000 (17.02.00)
(21) International Application Number: PCT/GB99/02605 (22) International Filing Date: 9 August 1999 (09.08.99) (30) Priority Data: 9817246.3 8 August 1998 (08.08.98) GB (71) Applicant (for all designated States except US): PETROLINE WELLSYSTEMS LIMITED [GB/GB]; Offshore Technology Park, Claymore Drive, Bridge of Don, Aberdeen AB23 8GD (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): METCALFE, Paul, David [GB/GB]; North Wing, Bucklerburn Steading, Peterculter AB14 0NP (GB). (74) Agents: MCCALLUM, William, Potter et al.; Cruikshank & Fairweather, 19 Royal Exchange Square, Glasgow G1 3AE (GB).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>

(54) Title: **CONNECTOR FOR EXPANDABLE WELL SCREEN**



(57) Abstract

A tubing connection arrangement (10) comprises two expandable tubing sections (12, 14), each tubing section comprising a filter screen (16, 18) sandwiched between inner expandable tubing (20, 22) and outer expandable tubing (24, 26). The filter screen of one tubing section overlaps the filter screen of the other tubing section and the outer expandable tubing of at least one of the tubing sections extends over the overlapping filter screens. On expansion of the tubing sections, the overlapping filter screens, restrained by the outer tubing, ensure the integrity of the filter between the tubing sections.

CONNECTOR FOR EXPANDABLE WELL SCREEN

This invention relates to a downhole connector, and in particular to an arrangement for ensuring the integrity of a sand screen or other filter medium at a connection between two lengths of expandable tubing utilised to support or form
5 a sand screen or filter.

In many well bores where a liquid, for example oil, passes from a surrounding formation into the well bore, the liquid will often carry entrained sand particles. If this sand is permitted to pass into the well bore a number of
10 problems may arise, including an increased likelihood of the well bore becoming blocked or restricted, and the sand may cause downhole tools to stick or jam, or wear prematurely. Accordingly, it is preferred that the sand particles are retained in the formation. This is achieved by providing
15 screens or a filter around the casing or production tubing.

International Patent Application WO 97/17524 (Shell), the disclosure of which is incorporated herein by reference, describes a radially expandable assembly in which overlapping filter sheets are sandwiched between inner expandable support
20 tubing and outer expandable protective tubing, the expandable tubing featuring large numbers of overlapping longitudinal slots. When an expander cone is forced through the assembly, the inner and outer tubing is expanded radially, the slots extending to form diamond-shaped openings. The initial
25 degree of overlap between the screens is selected such that,

tubing of the other tubing section.

Each filter screen will typically comprise a plurality of overlapping plates, sheets or membranes individually mounted to the respective inner expandable tubing by axially parallel connectors or fixings, such as screws, lugs or welds.

Preferably, the filter screens of each tubing section are initially radially spaced apart to facilitate make-up of the connector. However, on expansion, the resistance of the outer tubing to radial expansion of the inner tubing ensures that the outer filter screen is pressed into sand-tight engagement with the inner filter screen. The desired relative positioning of the filter screens of the two tubing sections may be achieved by providing one inner tubing section having an end of slightly larger diameter than the other. In certain embodiments the ends of each tubing section may be upset, that is of greater diameter than the remainder of the tubing section, and the desired difference in diameter may be achieved by providing a slightly higher upset on one tubing section. Conveniently, the inner tubing sections will feature pin and box connections, and the upset on the box may be slightly higher than the pin. Of course the opposite arrangement may be provided, that is the pin upset being higher than the box.

The ends of one or both filter screens may be provided with means for preventing interference between the screen ends when the tubing sections are rotated relative to one another, as may be the case if the tubing sections are

friction coating applied to the filter sheets, such as a PTFE-based material such as Teflon (trade mark). In other embodiments a friction-reducing lubricant, such as high temperature grease, may be provided. Alternatively, sheets of low friction material may be placed between the filter sheets and the tubing.

These and other aspects of the present invention will now be described, by way or example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic sectional view of part of a connector in accordance with a preferred embodiment of the present invention, with the connector parts shown separated; and

Figure 2 is a schematic sectional view of the connector of Figure 1, with the connector parts shown coupled together.

The drawings illustrate part of a connector 10 in accordance with an embodiment of the present invention. The connector 10 is provided between the ends of two sections of expandable tubing 12, 14, each comprising filter plates 16, 18 sandwiched between inner expandable support tubing 20, 22 and outer expandable protective tubing 24, 26. Each section of expandable tubing 20, 22, 24, 26 defines a large number of longitudinal overlapping slots. The sections of inner or base expandable tubing 20, 22 are formed with co-operating pin and box connections 28, 30, to allow the tubing sections 12, 14 to be made up by relative rotation.

As is more clearly apparent from Figure 2, the box connection 30 is upset from the pin 28. The filter plates 18

20, 22, 24, 26, and minimises the risk of tearing of the filter plates 16, 18 as the tubing sections are made up and expanded.

5 It will be clear to those of skill in the art that the above-described embodiment is merely exemplary of the present invention, and that various modifications and improvements may be made thereto without departing from the scope of the present invention.

section such that the filter screens are initially radially spaced apart.

6. The arrangement of claim 5, wherein the inner tubing of said one tubing section has an end of larger diameter than the end of the inner tubing of the other tubing section.

7. The arrangement of claim 6, wherein the ends of at least one tubing section is upset.

8. The arrangement of claim 7, wherein the ends of both tubing sections are upset, with a higher upset being provided on one tubing section.

9. The arrangement of claim 7 or 8, wherein the inner tubing sections incorporate pin and box connections, and the upset on the box is higher than the upset on the pin.

10. The arrangement of any of the preceding claims, wherein the end of at least one filter screen is provided with means for preventing interference between the screen ends when the tubing sections are rotated relative to one another.

11. The arrangement of claim 10, wherein said means for preventing interference is a sleeve of extendible material.

12. The arrangement of claim 11, wherein the sleeve extends internally of at least one of the filter screens.

11

the filter sheets and the tubing.

17. The tubing of claim 16, wherein the friction reducing means is a low friction coating applied to the filter sheets.

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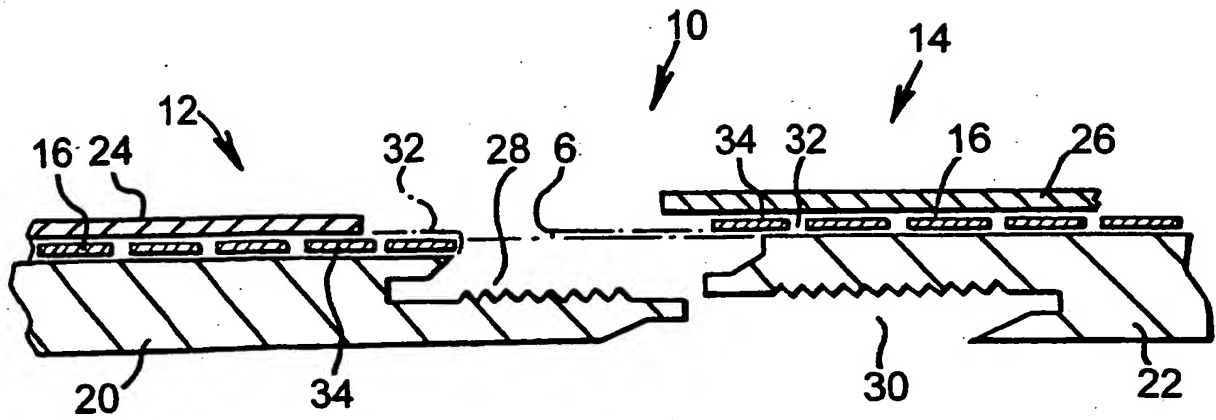


Fig. 1

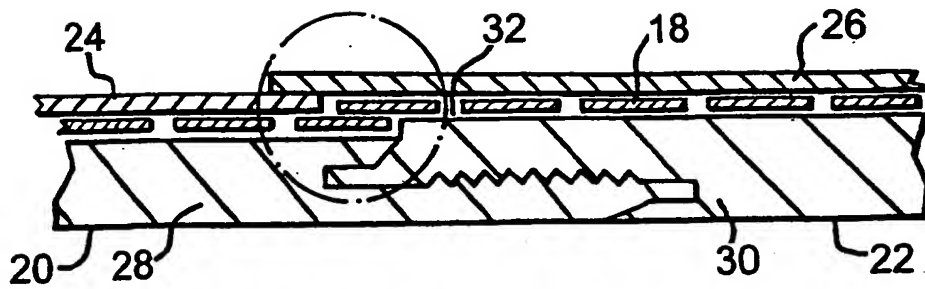


Fig. 2

PATENT COOPERATION TREATY
PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference AS/AM/P09326PC	FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below..</small>	
International application No. PCT/GB 99/ 02605	International filing date (day/month/year) 09/08/1999	(Earliest) Priority Date (day/month/year) 08/08/1998
Applicant PETROLINE WELLSYSTEMS LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.
☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

4. With regard to the title,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

CONNECTOR FOR EXPANDABLE WELL SCREEN

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

2
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 99/ 02605

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-15

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-15

Connection between expandable sand screen sections

2. Claims: 16, 17

Expandable sand screen section with reduced friction between filter layers

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02605

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E21B43/08 E21B43/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97 17524 A (SHELL CANADA LTD ;SHELL INT RESEARCH (NL)) 15 May 1997 (1997-05-15) cited in the application page 9, line 23 - line 26; figures 1,2 ---	1,15
A	EP 0 659 975 A (NAGAOKA KK) 28 June 1995 (1995-06-28) column 7, line 36 - line 58; figure 8 ---	1,15
A	US 4 754 807 A (LANGE UDO) 5 July 1988 (1988-07-05) claim 1; figure 1 ---	1,15
A	WO 98 22690 A (SHELL CANADA LTD ;SHELL INT RESEARCH (NL)) 28 May 1998 (1998-05-28) figures 1,2 -----	1,15



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

4 November 1999

Date of mailing of the international search report

03.03.00

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Bellingacci, F

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02605

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9717524	A	15-05-1997	AU 710745 B	30-09-1999
			AU 7568096 A	29-05-1997
			BR 9611456 A	17-02-1999
			EP 0859902 A	26-08-1998
			JP 11514712 T	14-12-1999
			NO 982087 A	07-07-1998
			NZ 322015 A	28-10-1999
			US 6012522 A	11-01-2000
			US 5901789 A	11-05-1999

EP 0659975	A	28-06-1995	JP 7158124 A	20-06-1995
			AU 7906994 A	08-06-1995
			BR 9404805 A	08-08-1995
			CN 1109548 A	04-10-1995
			US 5787980 A	04-08-1998

US 4754807	A	05-07-1988	DE 3614537 A	12-11-1987

WO 9822690	A	28-05-1998	AU 714026 B	16-12-1999
			AU 5656598 A	10-06-1998
			EP 0939854 A	08-09-1999
			NO 992359 A	14-05-1999

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From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

HARDING, Richard, Patrick
Marks & Clerk
4220 Nash Court
Oxford Business Park South
Oxford
OX4 2RU
ROYAUME-UNI

Date of mailing (day/month/year) 26 July 2000 (26.07.00)	
Applicant's or agent's file reference <u>AS/AM/P09326PC</u>	IMPORTANT NOTIFICATION
International application No. PCT/GB99/02605	International filing date (day/month/year) 09 August 1999 (09.08.99)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input type="checkbox"/> the inventor	<input type="checkbox"/> the agent
<input type="checkbox"/> the common representative		
Name and Address PETROLINE WELLSYSTEMS LIMITED Offshore Technology Park Claymore Drive Bridge of Don Aberdeen AB23 8GD United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input type="checkbox"/> the person	<input checked="" type="checkbox"/> the name	<input checked="" type="checkbox"/> the address
	<input checked="" type="checkbox"/> the nationality	<input checked="" type="checkbox"/> the residence
Name and Address WEATHERFORD/LAMB, INC. 515 Post Oak Boulevard Suite 600 Houston, TX 77027 United States of America	State of Nationality US	State of Residence US
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned	
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned	
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer A. Karkachi
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

McCALLUM, William Potter et al.
CRUIKSHANK & FAIRWEATHER
19 Royal Exchange Square
Glasgow G1 3AE
GRANDE BRETAGNE

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year) 11.05.2000

Applicant's or agent's file reference
AS/SC/PO9326PC

IMPORTANT NOTIFICATION

International application No.
PCT/GB99/02605

International filing date (day/month/year)
09/08/1999

Priority date (day/month/year)
08/08/1998

Applicant
PETROLINE WELLSYSTEMS LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AS/SC/PO9326PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/02605	International filing date (day/month/year) 09/08/1999	Priority date (day/month/year) 08/08/1998
International Patent Classification (IPC) or national classification and IPC E21B43/08		
Applicant PETROLINE WELLSYSTEMS LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/02605

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

Description, pages:

1-7 as originally filed

Claims, No.:

1-17 as originally filed

Drawings, sheets:

1/1 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
☒ claims Nos. 16, 17.

because:

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EXAMINATION REPORT**

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- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☒ no international search report has been established for the said claims Nos. 16, 17.

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:
 - ☐ restricted the claims.
 - ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ neither restricted nor paid additional fees.
2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
 - ☐ complied with.
 - ☒ not complied with for the following reasons:

see separate sheet
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
 - ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-15.

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EXAMINATION REPORT**

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-15
	No: Claims
Inventive step (IS)	Yes: Claims 1-15
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-15
	No: Claims

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/02605

Reference is made to the following document:

D1 = WO 97 17524 A

III - Non-establishment of opinion

III-1 Claims 16 and 17 cannot be examined as no search report has been drawn for them.

IV - Lack of unity of invention

The present application comprises the following (groups of) inventions:

- Claims 1-15: connection between expandable sand screen sections
- Claims 16, 17: expandable sand screen section with reduced friction between filter layers

Claims 1 to 15 relate to the connection between lengths of sand screens comprising a filter screen sandwiched between an inner expandable tubing and an outer expandable tubing. The "special technical feature" (in the meaning of Rule 13.2 PCT) of said claims is, that both the filter screen and the outer tubing of adjacent lengths overlap when the sections are connected together.

The problem solved by said special technical features is to achieve a "sand tight" connection between adjacent lengths of filter screens (description, page 2, lines 4 to 10).

Claims 16 and 17 relate to a single length of sand screen comprising a plurality of filter screens sandwiched between an inner expandable tubing and an outer expandable tubing. The "special technical feature" of said claims can be identified in the presence of means for reducing the friction between the filter screens when they are expanded.

The problem solved by said feature is to facilitate relative movement of the filter screens during expansion (description, page 4, lines 22-27) and decrease therefore the likelihood of damages occurring during the expansion of the screen.

The feature which is common to the two groups of inventions, that a sand screen comprises a filter screen sandwiched between an inner expandable tubing and an outer expandable tubing, is known in the art (see WO, A, 97/17524, fig. 1 and 2),

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EXAMINATION REPORT - SEPARATE SHEET**

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and therefore cannot be seen as the "special technical feature" of the two inventions.

The "special technical features" of the two groups of inventions solve therefore unrelated problems by means of unrelated features, whereby there is no single general inventive concept linking the inventions of the two groups.

V - Reasoned statement under Rule 66.2 (a)(ii)

V-1 D1, which is considered as the closest prior art, describes a tubing section comprising a filter screen sandwiched between an inner expandable tubing and an outer expandable tubing.

The subject-matter of claim 1 is new insomuch it relates to a tubing connection arrangement for two expandable sections as in D1, the filter screen of one tubing section overlapping the filter screen of the other tubing section and the outer expandable tubing of at least one of the tubing sections extending over the overlapping filter screens.

The subject-matter of claim 1 is therefore new and the claim meets the novelty requirement of Art. 33(2) PCT.

V-2 D1 does not disclose how the sections of expandable tubing are connected one to the other. The other cited documents do refer to the connection between sections of expandable tubing comprising also a filter element, but none of said documents suggest to arrange the filter element of one section so that it overlaps the filter element of the adjoining section. By this solution however a sand-tight connection is achieved also in correspondence of the joint.

Claim 1 meets therefore the inventive step requirement of Art. 33(3) PCT.

V-3 Claims 2 to 14 meet the requirements of Art. 33(2) and (3) PCT as they are formulated as depending from a claim which does meet said requirements. Method claim 15 meets also said requirements as it specifies, in method terms, the same inventive concept specified in apparatus terms in claim 1.

V-4 The devices and methods of claims 1 to 15 find industrial application in the completion of oil wells.

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EXAMINATION REPORT - SEPARATE SHEET**

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VII - Certain defects

VII-1 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

VII-2 The statement in the description at page 7, last paragraph, does not meet the requirements of Art. 6 PCT as interpreted in the PCT Guidelines, PCT/GL/3 III, 4.3a.